Overview of the European Land Data Assimilation (ELDAS) project

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ELDAS (see HTTP://WWW.KNMI.NL/SAMENW/ELDAS) explores the merits of a state-of-the-art soil moisture data assimilation system for prediction of dry periods in numerical weather prediction (NWP), timing and/or intensity of floodings, and evaluation of land surface processes in climate modeling applications. The past first year of ELDAS has been mainly devoted to the construction of a demonstration database over Europe and the design of a data assimilation system that extracts information on soil moisture from a blend of observation types, including synops and satellite data.

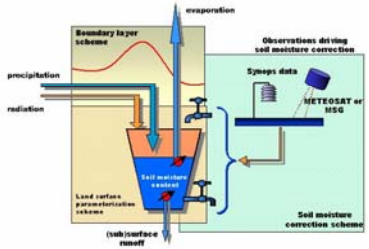

***Figure A**: Schematic layout of the ELDAS assimilation system. More information on the poster by **Gisela Seuffert** in this session.*

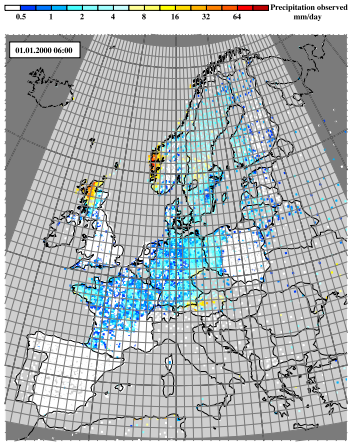

***Figure D**. Example of daily precipitation also showing the high resolution gauge network.*

1. Aims of ELDAS

ELDAS will deliver a prototype soil moisture data assimilation system, validate its products, and explore the potential improvements in meteorological and hydrological applications. Near real-time production of soil moisture estimates will be implemented after the finalization of ELDAS, late in 2004.

2. The data assimilation system

Use is made of a land surface model embedded in an NWP system (Fig. A). Precipitation and radiation are derived from observations. Corrections to the soil moisture content are applied by minimizing the difference between observed and modeled air temperature and humidity, surface heating rate (Fig B) and microwave emissivity. Fig. C shows a comparison between an optimum interpolation (OI) system and a variational procedure using air temperature and humidity. Shown is soil moisture content from these two systems, and a best estimate based on observed precipitation and radiation. The variational method is clearly shown to be superior in extracting relevant information from the observations.

3. Examples of European databases

3.1 Precipitation

Initially, the precipitation fields are based on an interpolation of over 12000 gauges across Europe (Fig. D). A later version of the precipitation database will merge these gauges with radar derived estimates.

3.2 Surface radiation: ELDORADO

Surface radiation is derived from calculations with a limited area version of the ECMWF model physics. Cloud cover and liquid water content in the model are adjusted in order to minimize the difference between modeled and observed (METEOSAT) top-of-atmosphere shortwave radiation and cloud cover. Fig. E shows a verification of surface shortwave radiation produced by this so-called ELDORADO assimilation scheme using 30 routine stations in The Netherlands.

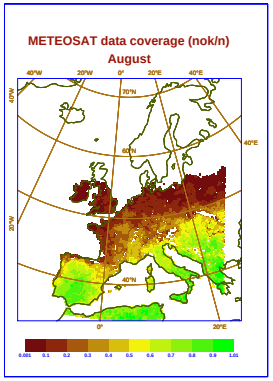

***Figure B**: Heating rate data coverage for August 2000.*

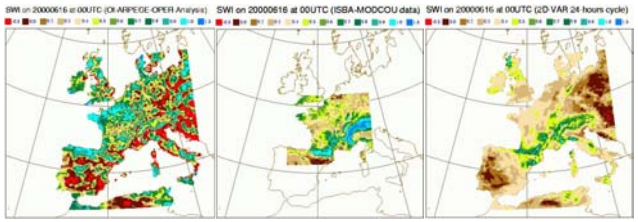

***Figure C**: Comparison between soil moisture content obtained from an operational OI system using air temperature and humidity (left), a best estimate based on observed precipitation and radiation (center), and a variational technique using the same observations as OI (right) (Balsamo et al. 2002)*

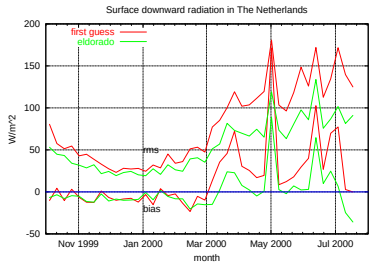

***Figure E**: Verification of surface shortwave radiation from ELDORADO for 30 observation stations in The Netherlands*

4. Further activities

ELDAS will pay considerable attention to validation and demonstration. These activities will develop as ELDAS will start producing soil moisture fields from the demonstration databases.

5. More information

This poster gives an overview of current state of progress in ELDAS Up-to-date information can be found on the ELDAS web-site and by contacting the corresponding author.

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ELDAS is supported by the European Commission's 5th Framework Program.